

Remarks/Arguments

## Informalities

5 Examiner:

Claim 1 is objected to because of the following informalities: In line 27, it appears that the phrase "the image signal will bypass the third microstrip" should read as -the image signal will bypass through the third microstrip- since the third microstrip is the stub which functions to shunt the image signal to ground (e.g. see the present specification page 7, section 24). Appropriate correction is required.

15 Response:

Claim 1 has been amended as suggested by the Examiner. No new material has been introduced. Reconsideration of claim 1 concerning informalities is respectfully requested.

20 Additionally, please accept replacement paragraph [0014] as identified in the Amendments to the Specification section of this response. In the replacement paragraph, the word "through" has been inserted into the phrase "the image signal will bypass the third microstrip" and the phrase  
25 now reads as --the image signal will bypass through the third microstrip--. The change was made merely to conform to the wording of the amended claim 1. No new material has been introduced.

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## Claim Rejections - 35 USC 103

## Examiner:

5 This application currently names joint inventors. In  
considering patentability of the claims under 35 U.S.C.  
103(a), the examiner presumes that the subject matter of  
the various claims was commonly owned at the time any  
inventions covered therein were made absent any evidence  
10 to the contrary. Applicant is advised of the obligation  
under 37 CFR 1.56 to point out the inventor and invention  
dates of each claim that was not commonly owned at the time  
a later invention was made in order for the examiner to  
consider the applicability of 35 U.S.C. 103(c) and potential  
15 35 U.S.C. 102(e), (f), or (g) prior art under 35 U.S.C.  
103(a).

## Response:

20 The subject matter of all claims in the current  
application was commonly owned by the assignee at the time  
of the invention and remains commonly owned by the same  
assignee.

## Examiner:

25 Claims 1-2 and 7-9 are rejected under 35 U.S.C. 103(a)  
as being unpatentable over Saka [US 5,015,976] in  
combination with Ye et al. [US 6,067,461]. Claims 3-6 are  
rejected under 35 U.S.C. 103(a) as being unpatentable over  
Saka and Ye et al. as applied to claim 1 above, and further  
30 in view of Hayt, Jr. (Engineering Electromagnetics).

**Response:**

Directly attaching the open-ended stubs taught by Saka (Fig.9) to the main line sections of Ye et al. does not generate the present invention for the following reasons.

5 In Ye et al. (Col.1, lines 23-40), one of ordinary skill in the art would select a length for the main lines of the bandpass filter to be  $1/4$  or  $1/2$  of the wavelength of the target signal. This is well known in the art and can be easily supported by U.S. Patent number 5,922,650 referred to in the cited Ye et al. disclosure (Col.1, line 45) and shares the same inventor and assignee as does the Examiner cited Ye et al. reference. In the '650 patent, Col.3, lines 10 45-47 state "In FIG. 6, there is shown a schematic top view of a prior art single half wavelength microstrip resonator circuit 35 on a substrate 6." Col.4, lines 56-61 continues with "For example, the invention can be used in a filter using multiples of quarter wavelength transmission line as resonators, in a stepped impedance filter, a lumped 15 element filter where the inductors are approximated by a piece of transmission line, in comb-line and in hairpin-line filters."

25 The cited Fig.9 of Saka discloses, "an input terminal 1 and an output terminal 2 for a radio frequency signal are connected by a main line 3 configured of a strip line." (Col.2, lines 12-14). "The lengths  $l_1$ ,  $l_2$ ,  $l_3$  and the intervals  $l_0$  of the open ended stubs are also determined in such a manner as to hold the relationships of both  $l_2 < l_1 < l_0 < 2l_2$  and  $l_2 < l_3 < l_0 < 2l_2$  at the same time or the relations 30  $l_2 < l_1 = l_3 < l_0 < 2l_2$ , while the length  $l_0$  is selected at a value about 1.5 times one fourth of the wavelength of the radio

frequency signal." (Col.2, lines 21-28).

5 It should be obvious to one skilled in the art that  
if the length of the sections of Ye et al. were altered  
to conform to the "1.5 times one fourth of the wavelength"  
rule of Saka, that the performance of Ye et al.'s device  
would change. MPEP 2143.02 says that if a proposed  
modification of a reference changes the principle of  
operation of the reference, then that modification is not  
10 obvious. The same reasoning exists against the obviousness  
of altering Saka to conform to the device of Ye et al. The  
specific structure of claim 9 would require even greater  
alteration of the principle of operation of either or both  
reference devices because of the effect of the gap between  
15 adjacent stubs.

20 Additionally, the present invention is functionally  
and structurally different from both Saka and Ye et al.,  
alone or in combination. This is because, in the present  
invention, the length of the main line is not determined  
according to a fraction of the wavelength of the target  
signal. Instead, the characteristics of the present  
invention main line is determined by the impedances Z1 and  
Z2, and the length d1 of the third microstrip (Figs.2-3).

25 Paragraphs [0029]-[0031] of the present application  
say that the two open stubs of the microstrip lines 32 and  
34 are electromagnetically coupled to each other to realize  
a J-inverter 44. An equivalent impedance Z1, is evaluated  
30 from the J-inverter 44 backward to the microstrip lines  
32 and 36 and the input circuit 40. An equivalent impedance  
Z2, is evaluated from the J-inverter 44 forward to the

microstrip lines 34 and 38 and the output circuit 42. If the characteristic impedance of the J-inverter 44 is J, the microstrip lines 32 and 34 can be adjusted to acquire equivalent impedances Z1 and Z2 to satisfy the relationship of  $j^2 = Z1 \times Z2$ . Consequently, the equivalent impedances, Z1 and Z2, are matched to each other through the J-inverter, and the target signal can be transmitted to the output circuit 42 without signal reflection.

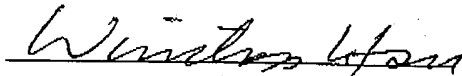
For at least these reasons, the Applicant believes that the present invention represents a new and useful device not taught or suggested in the prior art. Therefore, the reconsideration of claims 1-2 and 7-9 is respectfully requested.

Concerning claims 3-6, the circuit 44, end-coupled main lines in Figs. 2-3 of the present application, is devised to match optimal impedance relationships from the connecting open-ended stub to the appropriately designed main line as discussed above. Hayt, Jr. teaches a method of using stubs shunted with a section of transmission line with a similar goal of impedance matching, but the method and structure are different. The spacing between the end-coupled main lines also plays the role for DC current blocking to prevent the deviation of bias voltage and current of the transistor, which cannot be achieved using the method of Hayt, Jr.

For at least these reasons, the Applicant respectfully requests reconsideration of claim 3-6.

Sincerely,

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